

Appl. No. 10/811,124
Amdt. dated Nov. 7, 2005
Reply to Office action of Aug. 11, 2005

Listing of the Claims:

1. (currently amended) An integrated circuit having copper interconnecting metallization protected by a first overcoat layer, portions of said metallization exposed in a window opened through the thickness of said first overcoat layer, comprising:

a patterned conductive barrier layer positioned on said exposed portion of said copper metallization and on portions of said first overcoat layer surrounding said window;

a bondable metal layer positioned on said barrier layer, the thickness of said bondable layer suitable for wire bonding; and

a second overcoat layer disposed on the integrated circuit having an opening exposing the bondable metal layer and a portion of the first overcoat layer, the ~~surrounding said [[window]] member so that the surface of said second overcoat layer at the edge of said window is at or above the surface of said bondable layer.~~

2. (original) The circuit according to Claim 1 wherein said first overcoat thickness is from about 0.6 to 1.5 μm .

3. (original) The circuit according to Claim 1 wherein said first overcoat comprises one or more layers of silicon nitride, silicon oxynitride, silicon dioxide, silicon carbide, or other moisture-retaining compounds.

4. (original) The circuit according to Claim 1 wherein said barrier layer comprises tantalum nitride.

5. (original) The circuit according to Claim 1 wherein said barrier layer is selected from a group consisting of tantalum, titanium, tungsten, molybdenum, chromium, vanadium, alloys thereof, stacks thereof, and chemical compounds thereof.

6. (original) The circuit according to Claim 1 wherein said barrier layer has a thickness between about 0.02 and 0.03 μm .

TI-36905- 2

Appl. No. 10/811,124
Amdt. dated Nov. 7, 2005
Reply to Office action of Aug. 11, 2005

7. (original) The circuit according to Claim 1 wherein said bondable metal is aluminum or an aluminum alloy.
8. (original) The circuit according to Claim 1 wherein said bondable metal layer has a thickness suitable for wire bonding.
9. (original) The circuit according to Claim 8 wherein said bondable metal layer has a thickness between about 0.4 and 1.4 μm .
10. (currently amended) The circuit according to Claim 1 further comprising a ball bond attached to said ~~plug~~ the bondable layer.
11. (original) The circuit according to Claim 1 wherein said barrier and bondable metal layers overlap between about 0.1 and 0.3 μm over said surrounding portions of said first overcoat layer.
12. (original) The circuit according to Claim 1 wherein said second overcoat layer is an organic material selected from a group consisting of polyimide, benzocyclobutene, and related polymeric compounds.
13. (original) The circuit according to Claim 1 wherein said second overcoat layer has a thickness between about 0.5 and 5.0 μm .
14. (original) The circuit according to Claim 1 further comprising a distance separating the edge of said second overcoat and the edge of said combined barrier and bondable metal layers.
15. (original) The circuit according to Claim 14 wherein said distance is between about 3 and 6 μm .
16. (currently amended) A wafer-level method of fabricating a metal structure for a contact pad of an integrated circuit having copper interconnecting metallization protected by a first overcoat layer including insulating silicon compounds, comprising the steps of:

opening a window through the thickness of said first overcoat layer to expose portions of said copper metallization;

TI-36905- 3

Appl. No. 10/811,124
Amdt. dated Nov. 7, 2005
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depositing a barrier metal layer over said wafer to cover said exposed copper metallization and first overcoat surface;

depositing a bondable metal layer over said barrier layer in a thickness sufficient to fill said overcoat window and to enable wire ball bonding;

patterning both said deposited metal layers so that only the layer portions inside the window and over a first overcoat area close to the window perimeter remain;

depositing a second, organic, light-sensitive overcoat layer over said wafer; and

patterning the second overcoat to open a window through the thickness of the second overcoat layer to expose a portion of the first overcoat and the bondable metal layer.

~~so that the surface of said second overcoat at the edge of said window is at or above the surface of said bondable layer; and selectively removing said second overcoat layer from said bondable metal layer to expose said bondable metal for the process of wire bonding.~~

17-18. (canceled)

19. (original) The method according to Claim 16 wherein said step of depositing said second overcoat layer comprises a spin-on process.

20. (original) The method according to Claim 16 said second overcoat is an organic material selected from a group consisting of polyimide, benzocyclobutene, and related polymeric compounds.